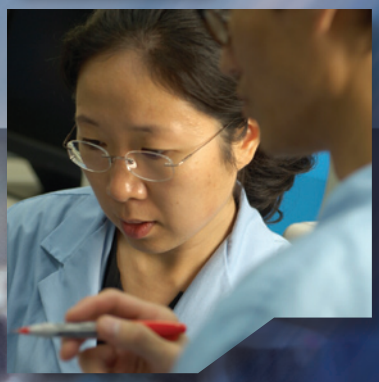
National Cancer Institute

National Cancer Institute at Frederick

BENCH TO BEDSIDE

ACCELERATING PROGRESS AGAINST CANCER AND AIDS



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health

"The National Cancer Institute at Frederick is a unique national resource because it offers such a wide range of advanced technologies that are important to creating the next generation of therapies for cancer and AIDS. NCI-Frederick, which brings together scientists from the government, academia, and private industry, is positioned to facilitate public-private partnerships that will be vital to the future of the entire National Cancer Institute."

Dr. John Niederhuber, Director
The National Cancer Institute

Cover photos (top to bottom): Dana Randall carefully examines materials as part of the critically important quality control of products prepared for biopharmaceutical development. Dr. Anil Patri measures nanoparticle size and topology. Senior scientists Drs. Zhen Xiao (left) and King Chan analyze results obtained from the characterization of a complex proteome sample. Technician Gary Bowers provides quality control of products for use in toxicologic studies and clinical trials.

BENCH TO BEDSIDE

October 2006

We partner with government, academic, and private-sector researchers to speed the translation of new knowledge into more effective treatments for cancer, AIDS, and other diseases.

National Cancer Institute at Frederick

A Federally Funded Research and Development Center

NCI-Frederick

The nation's only Federally Funded Research and Development Center devoted solely to biomedical research

NCI-Frederick partners with university, private sector, and government scientists to speed the translation of laboratory research into new treatments for cancer and AIDS.

With a unique array of advanced technologies, NCI-Frederick is bridging the gap between discovery and healthcare delivery. We assess research for its value to patients, accelerate its development, and deliver it to the business sector for commercialization.

Research partners locally and across the nation rely on NCI-Frederick to:

- Deliver GMP-quality prototype drugs with quick turnaround for clinical trials.
- Help win regulatory approval for new drugs, vaccines, and other therapies.
- Cut the cost of nanotechnology research through a standards-based approach.
- Produce large quantities of test vaccine with little lead time.
- Save on technology development costs through public/private partnerships.

NCI-Frederick is designated by Congress as one of 37 Federally Funded Research and Development Centers (FFRDC). These centers provide quick response and flexible capability in meeting federal research and development goals that cannot be met effectively by other means.

Our campus, north of Washington, D.C., is home to a wealth of expertise, including that of our own cancer and AIDS researchers, our technology development teams, and our regulatory liaisons and commercialization partners. This combination gives us a unique perspective that spans laboratory discovery, technology development, and healthcare delivery.

With our collaborators, we are answering the call from Congress and the public to show how taxpayer investments in biomedical research are helping to ease—and to end—the suffering and death caused by cancer, AIDS, and other diseases.

Non-labor Expenditures

A History of Advances at NCI-Frederick

1977 Taxol – Samples of the Pacific yew's bark, originally collected under NCI contract by the Department of Agriculture, demonstrate antitumor activity. Now the most-used cancer drug, Taxol is effective against ovarian and breast malignancies.

1981 Biological Response Modifiers Program – Established to investigate, develop and bring to clinical trials potential therapeutic agents that may alter biological responses affecting cancer growth and metastasis.

1982 Central Repository – Established to assist investigators in storing research specimens pivotal to the scientific mission of NCI. Now more than 4 million vials are stored under computerized inventory.

1985 HIV antibody testing – The test has been used to guard the nation's blood supply against contamination by the AIDS virus.

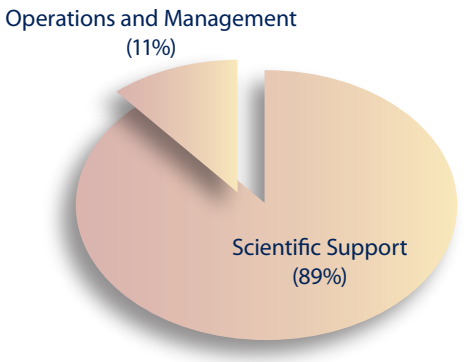
1986 The first supercomputer dedicated exclusively to biomedical research is installed at NCI-Frederick. Now there is a wide range of high-performance, high-capacity computing resources.

NCI-Frederick has produced or collaborated on:

- A vaccine for lymphoma, which is in clinical trials.
- Clinical trials of a vaccine that can prevent cervical cancer.
- The test that guards the nation's blood supply from contamination by the AIDS virus.
- Taxol for treating breast and ovarian cancers.
- More than 300 clinical trials to verify the effectiveness of new therapies.

In the face of change, NCI-Frederick remains vigilant. We reduce or phase out programs when necessary to maintain a strategic focus and to keep pace with new discoveries, development opportunities, and healthcare priorities.

Effective Budget Usage



2006 Highlights

- A national pilot program is designed to give patients optimal cancer care in their hometowns so they do not have to commute to major cancer centers.
- A clinical-grade MRI opens for research studies that may accelerate the use of nanotechnology in medicine.
- The Vaccine Pilot Plant begins production with test vaccines for Ebola hemorrhagic fever and avian influenza for clinical trials at the National Institute of Allergy and Infectious Diseases.
- NCI-Frederick has a new beamline set up at Argonne National Laboratory to accelerate the intricate study of proteins associated with human disease.

1993 Biopharmaceutical Development Program – Supports feasibility through development and manufacturing to filing of regulatory documentation for prototype drugs, vaccines, and other therapeutic agents.

1998 Rapid Access to Intervention Development – Speeds the translation of novel anticancer therapies from the laboratory to the clinic.

2003 Expanded AIDS clinical trials in Mali, China, India, South Korea.

2005 TIGER Biosensor – Identifies new and bioengineered pathogens by their DNA.

2005 Nanotechnology Characterization Laboratory opens.

2006 Vaccine Pilot Plant opens.

Advanced Technologies

For universities, government researchers, and private partners

Nanotechnology lab cuts costs, accelerates research

A researcher tried for six months to solve this problem: Once his potential cancer drug entered the bloodstream, it could not be detected. He had no way to monitor its whereabouts. But for clinical trials, he would have to track the drug as it coursed through the body.

The researcher, unnamed for proprietary reasons, tried unsuccessfully to solve this problem with the help of colleagues, academic researchers, and scientists at a drug company that was eager to invest in the technology, if only it would clear this hurdle.

NCL scientists like Dr. Anil Patri formulate and validate protocols that rigorously characterize nanoparticles' physical properties, *in vitro* characteristics, and toxicology profiles in animal models.

Then the researcher approached NCI-Frederick's Nanotechnology Characterization Laboratory. The laboratory is a national resource that accelerates the translation of biotechnology research at the nanoscale into new diagnostic tests, imaging agents, and cancer treatments. The lab is part of the NCI Alliance for Nanotechnology in Cancer, a comprehensive, systematized initiative involving public-private partnerships designed to accelerate the application of nanotechnology to cancer.

Anyone at a university or business can submit nanoparticles to the laboratory for characterization and preclinical efficacy and toxicity testing.

"We developed an assay using electrophoresis that could easily detect the particles in blood, and we did it in six weeks," said laboratory director Scott McNeil, Ph.D.

Having ready access to NCI-Frederick's range of advanced technologies sped up the process. McNeil had the facilities and expertise to deal with the nanoparticles. Colleagues at NCI-Frederick's Research Technology Program provided additional expertise and instrumentation to complete the assay.

The Nanotechnology Characterization Laboratory accepts all kinds of nanoparticles, including liposomes, dendrimers, gold nanoshells, quantum dots, and fullerenes. These are characterized under standardized protocols developed in collaboration with the Food and Drug Administration (FDA) and the National Institute of Standards and Technology.

This standards-based approach will reduce the cost and risk associated with developing nano-technologies against cancer. The previous lack of standards has led to conflicting reports in the scientific literature and widespread misconceptions about nanotechnology's clinical potential.

Because of its close association with the FDA, the laboratory can provide valuable advice and assistance to researchers who want to get their nanotechnology into clinical trials.

"They can go straight to the FDA for approvals, or they can come to us and we can help them generate data in support of their application for clinical studies," McNeil said. "Our laboratory is not involved in the regulatory process, but we can let researchers know about trends that we have observed in nanoparticles. This could put them in a stronger position to move forward."

A major goal of the laboratory is to give researchers a better understanding of all of the basic parameters that can affect particle behavior at the nanoscale. This will help scientists be more effective in engineering the next generation of nanotechnologies. If a specific surface charge is toxic, for example, then that charge should be avoided. Conversely, if an attribute is desirable for medical purposes, then it should be pursued. Some particles, such as contrast agents, should leave the body quickly. Other particles, such as those for therapy, may need to stay in the body for hours or days.

Much of the laboratory's data is initially confidential because of proprietary interests. This inhibits the immediate publication of research discoveries in peer-reviewed journals. But as soon as possible, the laboratory reports on trends and general observations by publishing in the literature, making presentations, and posting to its Web site.

Some of the laboratory's findings may come as a surprise. For years, gold has been a safe bet for many medical uses, from dental crowns to stents. The lustrous metal is biocompatible and resists bacterial buildup. It is opaque to X-rays and can be implanted with precision. As a nanoparticle, however, all bets are off.

Gold's behavior at the nanoscale is unpredictable. One kind of protein will stick to gold particles of one size. An entirely different protein will stick to gold particles of another size. These protein interlopers can have dramatically different effects.

"It can mean the difference between rapid expulsion from the body or lingering for a much longer time," McNeil said.

In another surprise discovery, the laboratory has found that one category of nanoparticles can have catalytic properties – the particles behave like biological enzymes. This was a finding that could have remained hidden for months or years during product development.

By having nanoparticles well characterized, researchers can avoid the unexpected.

Other Advanced Technologies

Advanced Biomedical Computing

The center provides state-of-the-art, high-performance computing and data management support and technology to NCI, NIH, and extramural biomedical researchers. These services include sequence analysis, database design, computational chemistry, molecular modeling and visualization, and crystallography.

Gene Expression

The Gene Expression Laboratory performs quantitative polymerase chain reaction (PCR), full-length DNA code sequencing, shRNA techniques, and recombinant adenovirus and lentivirus production.

Genomics

This includes genotyping and sequencing, microarray technology, laboratory automation, real-time PCR, peptide synthesis, data analysis and management, and clinical diagnostics.

Imaging

The Image Analysis Laboratory offers a range of services in confocal and electron microscopy.

Phenotypical Evaluation of Genetically Engineered Mice

The Pathology-Histology Laboratory prepares molecular and histologic pathology reports, and performs necropsies, specialized microtomy, digital photography and image analysis, embryologic evaluations, laser-capture microdissection, hematology, and blood chemistry.

Protein Chemistry

The Protein Chemistry Laboratory offers Surface Plasmon Resonance (SPR) spectroscopy, protein chemistry and characterization, molecular binding, and mass spectometry.

Protein Expression

The Protein Expression Laboratory performs gene cloning, expression optimization in E. coli, cell-free expression, instrumented expression, and protein purification.

Proteomics and Analytical Technologies

NCI-Frederick offers protein identification, peptide mapping, quantitative proteomics, small-molecule identification, separation technologies, and Nuclear Magnetic Resonance (NMR) spectroscopy.

Transgenic Mice

The Laboratory Animal Sciences Program produces customized transgenic mice and provides consulting, characterization, and analytical services.

Public/Private Partnerships

NCI-Frederick accelerates drug and vaccine development

Biopharm moves academic research into early clinical trials

The Biopharmaceutical Development Program (BDP) works with academic researchers, government scientists, and others to accelerate the development of promising new concepts for drugs and vaccines.

Ken Huyser fills vials for processing; BDP expedites the drug development timeline.

Recent disease targets include childhood leukemia, pancreatic cancer, melanoma, lymphoma, brain cancer, prostate cancer, head and neck cancer, and graft-versus-host disease, a side-effect of bone marrow transplants for leukemia.

Academic researchers can submit candidate drugs and vaccines to the program under the NCI Rapid Access to Intervention Development (RAID). These undergo peer review, and the best ones are selected for further development and use in early clinical studies.

Candidate agents also come from the NCI Intramural Program and from other government programs that target diseases such as diabetes or infectious diseases. The BDP also accepts material from pharmaceutical companies through NIH Collaborative Research and Development Agreements.

Since its inception in 1993, BDP has undertaken more than 100 projects. These projects have resulted in 30 candidate agents, which are still in the product pipeline, and 50 products that have been released for clinical studies. The BDP continues to monitor these for product stability until the clinical studies using them are closed.

The BDP concentrates on the best concepts and addresses key issues early in selection and development. An expert panel closely monitors each project to ensure that only the most promising ones move forward. Success also depends on getting a great number of strong candidate products into the pipeline.

Novel drugs may need to be refined several times before they are suitable for human clinical trials. Success in these trials is often necessary to attract industrial partners. Then the BDP must communicate essential manufacturing, testing, and product development issues in a technology transfer process with the principal investigator or company.

One example of an evolving concept is a family of immunotoxins initially developed in the intramural NCI laboratory of Ira Pastan, M.D. Immunotoxins genetically combine a targeting antibody fragment with a toxin. Cancer cells are killed when they take up the antibody along with the attached toxin. Even a single molecule of an internalized toxin might be lethal to a cell.

Clinical trials of the immunotoxin BL-22 were favorable in patients with hairy cell leukemia. To make the immunotoxin useful for a wider range of patients, Pastan's group increased the affinity of the targeting antibody to produce HA-22, which a company is commercializing.

As part of the technology transfer, scientists from the company visited the plant during production runs to learn about the manufacturing process BDP had developed for HA-22. Using this knowledge, the company is scaling up to take HA-22 forward to phase III trials.

Meanwhile, an initial clinical trial will begin using material made by BDP under a Collaborative Research and Development Agreement between the company and NCI. This strategy will expedite the drug development timeline.

Vaccine Pilot Plant begins production; a unique government/ private partnership

The federal government's only vaccine manufacturing facility opened this year, giving researchers the ability to quickly test vaccines for natural and bioengineered microbes that pose a threat to human health.

The Vaccine Pilot Plant is part of the Dale and Betty Bumpers Vaccine Research Center (VRC) at the National Institute of Allergy and Infectious Diseases (NIAID), National Institutes of Health (NIH).

The plant, funded by NIAID to support its mission, gives NIH maximum flexibility to conduct urgent research and to partner with the private sector to accelerate the development of vaccines against a wide range of diseases, including HIV/AIDS.

The facility also strengthens NIAID's capacity to develop medical countermeasures for emerging natural and bioengineered health threats.

"The plant will give us greater speed and flexibility," said Phillip Gomez, Ph.D., M.B.A., director of the Vaccine Production Program at the VRC. "With the pilot plant, we have the option of initiating production in a matter of weeks."

The plant, which operates under current Good Manufacturing Practices, opened in the spring of 2006, turning out candidate vaccines developed at the VRC for Ebola hemorrhagic fever and avian influenza. A prototype vaccine for HIV/AIDS is also in the pipeline. Each of these vaccines is to be tested in phase I or II clinical trials.

> *"…we have the option of initiating production in a matter of weeks."*
>
> *—Phillip Gomez, Ph.D., M.B.A.*

As a Federally Funded Research and Development Center, NCI-Frederick had the flexibility to design, develop, and operate the facility through its prime contractor, SAIC-Frederick, Inc. After extensive review and planning, NIH authorized NCI to proceed. The project went from a completed design into production in 18 months, ahead of schedule and under budget.

SAIC-Frederick leased space in an industrial park near Frederick, Md., allowing the plant to be developed rapidly upon completion of its design. The plant's highly skilled personnel, many with extensive industry experience, provide the expertise needed to support the research mission of the VRC.

The VRC has collaborative research and development agreements with multiple private sector partners—including Vical, GenVec, Chiron, and Crucell—to develop vaccines against HIV/AIDS, Ebola hemorrhagic fever, West Nile virus, and severe acute respiratory syndrome.

Robert Fitzimmons (left) and Paul Mutolo examine schematics for the Vaccine Pilot Plant, which produces vaccine candidates aimed at infectious diseases worldwide.

Bench to Bedside

Bridging the gap through translational research

First Cancer Vaccine Wins FDA Approval

The first vaccine that protects against cancer was approved for patients this year, but studies of the immunity it confers will be ongoing.

The vaccine triggers neutralizing antibodies against strains of the human papillomavirus that cause most cases of cervical cancer. But long-term protection usually requires a more complete immune response.

Ligia Pinto, Ph.D., head of the Human Papillomavirus Immunology Laboratory at NCI-Frederick, will conduct ongoing studies of the immune response to the vaccine with the goal of understanding determinants of its long-term effectiveness.

Pinto, whose laboratory supports NIH's Division of Cancer Epidemiology and Genetics, has collaborated in research on the human papillomavirus with investigators at the Center for Cancer Research at NCI in Bethesda, Md., and The Johns Hopkins University.

Cervical cancer is the second leading cause of cancer death in

women, claiming about 230,000 lives a year worldwide. The disease has declined in the United States with regular Pap testing, but it will strike nearly 10,000 American women this year.

Most cervical cancers are caused by the sexually transmitted human papillomavirus. Merck's vaccine Gardasil®, approved by the Food and Drug Administration in June, protects against strains of the virus that cause about 70 percent of cervical cancers. Because the vaccine does not provide complete coverage, Pap testing will continue to be an important prevention and detection strategy.

Gardasil® is a recombinant vaccine given in three injections over six months and is currently recommended for females ages 9 to 26.

Pinto's laboratory will be monitoring immune responses in an ongoing phase III clinical trial involving a vaccine similar to the FDA-approved product. The study of more than 7,000 women in Costa Rica may reveal more details about how the vaccine induces protection and how long it lasts.

"We hope that what we learn from this trial will help us improve HPV vaccines and design better therapeutic strategies," Pinto said.

Discovery

- Cancer biology
- Cell-cycle regulation
- Drug resistance
- Genetics/Molecular genetics
- HIV/AIDS research
- Immunology
- Virology and pathogenesis
- Mouse models development

Development

- Biopharmaceutical Development Program
- National Institute of Allergy and Infectious Diseases (NIAID) Vaccine Clinical Materials Program
- Natural products: Drug discovery and screening
- FDA cGMP (current Good Manufacturing Practices) quality

Delivery

- Cancer Imaging Program (CIP)/ Development of Clinical Imaging Drugs & Enhancers (DCIDE)
- Translational Research Initiative
- Lab-based monitoring of cancer and HIV trials
- NIAID national/international clinical trials monitoring
- Bioprocessing: Storage of multicenter trial specimens

Support for University and Government Laboratories

- The Biopharmaceutical Development Program has delivered more than 29,000 vials of clinical-grade biologicals to extramural investigators.
- NCI-Frederick provided $34.5 million in services to 220 NCI-supported and 93 NIAID-supported extramural clinical trials to test innovative treatments for cancer, AIDS and other diseases, both nationally and internationally.
- NCI-Frederick's Advanced Biomedical Computing Center provided state-of-the-art computational services to 524 extramural investigators in academia and other government agencies.
- In the last year, NCI-Frederick provided 1,112,995 research animals to intramural and extramural researchers.
- NCI-Frederick ships more than 9,000 unique research products each year to the extramural community. Products include antibodies, assay kits, cell lines, plasmids, recombineering reagents, viruses, natural products, and cytokines.
- The Biological Resources Branch Preclinical Repository has provided, at no cost, more than $10 million worth of high-quality research reagents (cytokines, monoclonal antibodies, and cytokine standards) to universities and industry.
- In the past six years, NCI-Frederick completed more than 3,500 Material Transfer Agreements with the extramural community. In most of these, NCI-Frederick provided a unique biological material or research service to an extramural laboratory.
- More than 130 clinical development projects have been approved through the NCI's Rapid Access to NCI Discovery Resources program and its RAID initiative, both of which began in 1998.
- The extramural community has repeatedly endorsed Extraordinary Opportunities for Investment, special program initiatives, such as targeted therapies, conducted through NCI-Frederick, and has been the primary financial beneficiary of these programs.
- NCI-Frederick laboratories are hosting more than 400 visiting scientists, including: post-doctoral fellows, graduate students, and scientists on sabbatical.
- NCI-Frederick provides scientific support for 26 of the 28 NIH Institutes and Centers, and seven other government agencies: the Food and Drug Administration, Department of Agriculture, National Institute of Standards and Technology, Department of Homeland Security, and the Department of Defense's Uniformed Services University of the Health Sciences and U.S. Army Medical Research Institute of Infectious Diseases.

Using mass spectrometry and other state-of-the-art equipment, David Aaron Lucas (left) and John Klose quantitatively measure specific, clinically important proteins within complex biological samples.

NCI-Frederick and the Community

Teaching, volunteering, doing business

Thirty-four years ago, a handful of scientists from the National Cancer Institute moved into a few buildings, set up offices and laboratories, and went to work on their passion: the fight against cancer. Today we are almost 3,000 strong—federal and contractor employees conducting basic, developmental, and clinical research on cancer, HIV/AIDS, and other threats to public health. NCI-Frederick is the county's second-largest employer, after Frederick County Public Schools.

All along the road to scientific discovery, NCI-Frederick employees have been engaged with their community. They teach at local colleges and universities. They facilitate and counsel cancer recovery and survivor groups, judge science fairs, and speak with citizens' groups.

NCI-Frederick employees also volunteer at Frederick Memorial Hospital and at special camps for children living with cancer or HIV or dealing with loss associated with disease. NCI-Frederick and its four contractors support community projects such as Frederick Reads and the HOPE VI housing initiative with their financial resources and their valuable time.

NCI-Frederick spends $9.7 million in Frederick County annually

Promoting science and math education from the first grade through graduate school is a priority for nurturing and developing the next generation of scientists and researchers. NCI-Frederick employees are sharing their knowledge and experience with Frederick County students in many venues and many ways.

Two award-winning education initiatives are the Elementary Outreach Program for grades one through five and the Werner H. Kirsten Student Intern Program for high school students. Over the past five years, more than 14,000 students in Frederick County have experienced hands-on scientific inquiry through these two programs—from third-graders growing blue-green algae in a vial to high-school interns doing research on cancer genetics and molecular targeting of tumor cells.

NCI-Frederick employees hold adjunct faculty and guest lecturer positions at a number of colleges and universities, including Frederick Community College, George Washington University, Hood College, The Johns Hopkins University, Mount Saint Mary's University, Georgetown University, and the University of Maryland.

NCI-Frederick and the Frederick community have a close relationship in today's fight against cancer and AIDS and in preparing the scientists of tomorrow.

The Elementary Outreach Program sends teams of scientists and nonscientists into local elementary schools to interact with teachers and offer instruction to students.

NCI-Frederick administration and selected contacts

Craig Reynolds, Ph.D.,
Associate Director, NCI;
Director of Scientific Operations, NCI-Frederick

Don Wheatley,
Chief Contracting Officer, NCI-Frederick

Charles River Laboratories *(contractor)*
Patricia Fritz, Ph.D., Principal Investigator

Data Management Services, Inc. *(contractor)*
James Racheff, Principal Manager

SAIC-Frederick, Inc*. (contractor)*
Larry Arthur, Ph.D., Principal Investigator, OTS Contract

Wilson Information Services Corporation *(contractor)*
Susan Wilson, Project Manager

Robert Wiltrout, Ph.D., Director
Center for Cancer Research
National Cancer Institute
(301) 496-4345
wiltrour@mail.nih.gov

James Doroshow, M.D., Director
Division of Cancer Treatment and Diagnosis
National Cancer Institute
(301) 496-4291
doroshoj@mail.nih.gov

Joseph F. Fraumeni, Jr., M.D., Director
Division of Cancer Epidemiology and Genetics
National Cancer Institute
(301) 496-1611
fraumeni@nih.gov

Carl Garland, Ph.D., Administrative Director
Research Technology Program
National Cancer Institute at Frederick
(301) 846-5425
garland@ncifcrf.gov

Hendrick Bedigian, Ph.D., Director
Laboratory Animal Sciences Program
Center for Cancer Research
National Cancer Institute at Frederick
(301) 846-1542
bedigianh@mail.ncifcrf.gov

Michael W. Baseler, Ph.D., Manager
Clinical Services Program
National Cancer Institute at Frederick
(301) 846-5217
mbaseler@ncifcrf.gov

Mary Carrington, Ph.D., Director
Basic Science Program
National Cancer Institute at Frederick
(301) 846-1390
carringt@ncifcrf.gov

George Mitra, Ph.D., Director
Biopharmaceutical Development Program
National Cancer Institute at Frederick
(301) 846-5999
mitra@ncifcrf.gov

Barry L. Gause, M.D., Director
Clinical Research Program
National Cancer Institute at Frederick
gauseb@navmed.nci.nih.gov

Phillip L. Gomez III, Ph.D., M.B.A., Director
Vaccine Production Program
Dale and Betty Bumpers Vaccine Research Center
National Institute of Allergy and Infectious Diseases
(301) 594-8485
pgomez@mail.nih.gov

George C. Tarr, Ph.D., Director
Vaccine Pilot Plant
Vaccine Production Program
Dale and Betty Bumpers Vaccine Research Center
National Institute of Allergy and Infectious Diseases
(301) 228-4017
tarrc@ncifcrf.gov

NCI-Frederick Facts

Personnel

- Approximately 1,000 federal employees and 2,000 contractor employees
- Approximately 100 NCI principal investigators on site
- Multidisciplinary work force
- 20 percent PhD, MD, or DVM
- 30 percent AA, BA, BS, or MS
- Award-winning work force: numerous awards and citations earned by NCI-Frederick and its employees for community service and philanthropy

History and Facilities

- Established in 1972 by Presidential Directive and designated in 1975 as an FFRDC dedicated to biomedical research
- Occupies 68 acres of land with 109 buildings totaling 1.3 million gross square feet
- Strategically located with the National Interagency Biodefense Campus at Fort Detrick in Frederick, Maryland

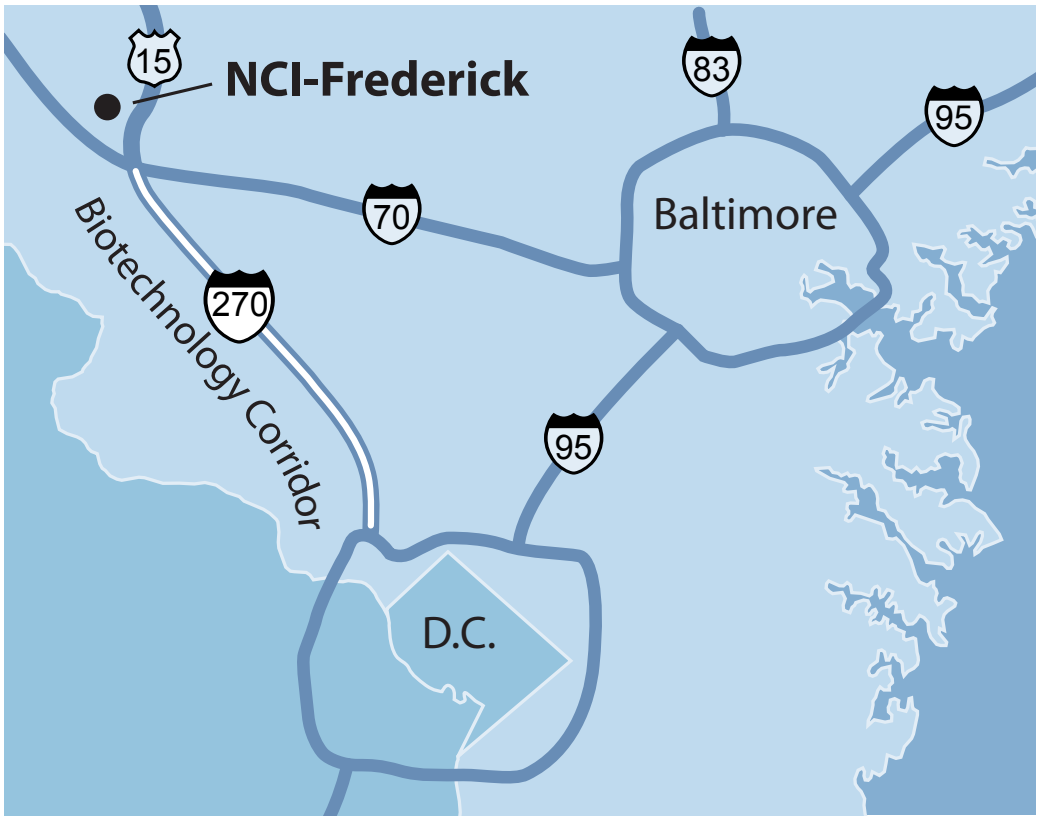
Scientific Contributions

- Published 727 peer-reviewed research articles and abstracts. (10/05 - 9/06)
- Entered into 74 Cooperative Research and Development Agreements (CRADAs) with universities and industry since January 2000
- Completed 3,547 Material Transfer Agreements (MTAs) since January 2000
- Currently engaged in 37 biopharmaceutical development projects
- Provided scientific support for 26 of the 28 NIH institutes, centers, and offices
- Monitored more than 300 national and international cancer and HIV clinical trials
- Produced alpha-Interferon Hyb-3, the only compound active against the SARS virus
- Developed the blood test for HIV infections, of importance to ensuring the safety of the nation's blood supply

Distinctions

- Cited by The Scientist as #7 in the Top Ten U.S. Research Institutions "Best Places to Work – Academia" in 2003 and among the top ten "Best Places to Work for Postdocs" in 2004 and 2005
- Cited by the Maryland Work-Life Alliance as an "Excellent Workplace" in 2004, 2005, and 2006
- Recipient of the 2005 Frederick Family Friendly Award from the Frederick County Office for Children and Families
- Second-largest employer in Frederick County, after Frederick County Public Schools.
- Largest *Mouse Models of Human Cancers Consortium* in the United States
- Home of the Advanced Biomedical Computing Center (ABCC), the world's largest high-performance computing resource dedicated exclusively to biomedical research
- Supplier of NCI substrain of rodents to NIH-supported investigators worldwide
- NCI-Frederick programs operate under the following FDA regulations as applicable:
  - Good Laboratory Practices (GLP)
  - Good Manufacturing Practices (GMP)
  - Good Clinical Practices (GCP)

NCI-Frederick: The northwest anchor of the I-270 Biotechnology Corridor



NCI-Frederick is located on National Institutes of Health property at Fort Detrick in Frederick, Maryland.

For further information, contact:
Office of Scientific Operations
NCI-Frederick
Post Office Box B, Frederick, MD 21702-1201
301-846-1108 • www.ncifcrf.gov

National Cancer Institute
at Frederick

Bench to Bedside
October 2006

NATIONAL CANCER INSTITUTE